

## WHAT IS CLAIMED IS:

1. A blood pump comprising:  
a stationary housing structure;  
5 a rotative impeller mounted within the stationary housing structure and defining with the stationary housing structure passages through which blood pumped by the rotative impeller flows through the pump;  
an inflow bearing comprising an inflow frusto-conical face of the rotative impeller and an inflow frusto-conical bushing of the stationary  
10 housing structure having an inner face;  
an outflow bearing comprising an outflow frusto-conical face of the rotative impeller and an outflow frusto-conical bushing of the stationary housing structure having an inner face;  
wherein the inner face of both the inflow and outflow frusto-conical  
15 bushings (a) comprises at least three axial grooves evenly spread out around a longitudinal axis of the blood pump, and (b) successively defines a taper and a land in the direction of rotation of the rotative impeller between each pair of successive grooves, the taper having a diameter that gradually decreases in the direction of rotation of the rotative impeller and  
20 the land having a generally constant diameter to form a seat for the frusto-conical face of the rotative impeller.
2. A blood pump as defined in claim 1, wherein each groove spans an angular sector of approximately  $20^\circ$  about the longitudinal axis of the  
25 blood pump.
3. A blood pump as defined in claim 1, wherein each taper of the inner face of the inflow frusto-conical bushing spans an angular sector of approximately  $82.5^\circ$  about the longitudinal axis of the blood pump.  
30
4. A blood pump as defined in claim 1, wherein each land of the

inner face of the inflow frusto-conical bushing spans an angular sector of approximately 17.5° about the longitudinal axis of the blood pump.

5        5. A blood pump as defined in claim 1, wherein each taper of the inner face of the outflow frusto-conical bushing spans an angular sector of approximately 80° about the longitudinal axis of the blood pump.

10       6. A blood pump as defined in claim 1, wherein each land of the inner face of the outflow frusto-conical bushing spans an angular sector of approximately 20° about the longitudinal axis of the blood pump.

15       7. A blood pump as defined in claim 1, wherein each taper of the inner face of the inflow frusto-conical bushing creates, from the groove to the land, a gradual 0.030 mm clearance increase between the inner face of the inflow frusto-conical bushing and the inflow frusto-conical face.

20       8. A blood pump as defined in claim 1, wherein each land of the inner face of the inflow frusto-conical bushing defines with the inflow frusto-conical face a clearance of approximately 0.0116 mm.

25       9. A blood pump as defined in claim 1, wherein each taper of the inner face of the outflow frusto-conical bushing creates, from the groove to the land, a gradual 0.025 mm clearance increase between the inner face of the outflow frusto-conical bushing and the outflow frusto-conical face.

30       10. A blood pump as defined in claim 1, wherein each land of the inner face of the outflow frusto-conical bushing defines with the outflow frusto-conical face a clearance of approximately 0.0226 mm.

30       11. A blood pump as defined in claim 1, wherein the inflow bearing has a cone angle of approximately 20°.

12. A blood pump as defined in claim 1, wherein the outflow bearing has a cone angle of approximately  $19.111^\circ$ .

5           13. A blood pump as defined in claim 1, further comprising a motor structure including winding means in the stationary housing structure and permanent magnet means in the rotative impeller, and wherein the winding means and permanent magnet means are axially offset to produce a pull of given strength toward the outflow bearing.

10           14. A blood pump as defined in claim 1, wherein one of the blood flow passages around the outflow bearing has a slight reduction of cross-sectional area to provoke a slight acceleration of the blood flow that improves cleaning of the space between the outflow frusto-conical face of  
15 the rotative impeller and the inner face of the outflow frusto-conical bushing.

          15. A blood pump as defined in claim 1, wherein one of the blood flow passages around the inflow bearing has a slight reduction of cross-  
20 sectional area to provoke a slight acceleration of the blood flow that improves cleaning of the space between the inflow frusto-conical face of the rotative impeller and the inner face of the inflow frusto-conical bushing.

          16. A blood pump as defined in claim 1, wherein the rotative  
25 impeller comprises an impeller shaft having two opposite ends respectively defining the inflow and outflow frusto-conical faces of the rotative impeller.